Faculty of Management Technology

Working Paper Series

Measuring the Quality of Banking Regulation in Egypt

by

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Working Paper No. 17

October 2009

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Abstract

The free market economy most countries pursue nowadays is never entirely free from government intervention. Policy makers devote special attention to the regulation of financial markets and with the current financial crisis, the quality of the banking regulations need to be reconsidered. This paper aims to provide a tool to measure the quality of banking regulation and supervision. This is usually a difficult task because it is a qualitative analysis and is arbitrary. However, a regulation index has been modelled that is similar to the concept of a cost-benefit analysis. The input index resembles the cost signifying the efforts made by governments and supervisors to measure the intensity of the regulation. The output index resembles the benefit which shows the outcome of the governments' efforts. Finally, applying this index on Egypt filled a research gap in this area.

JEL classification

G28, G21; L51

Keywords

Banking regulation, Quality index, Egypt

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1. Introduction

Having a healthy banking system is an issue of concern for every economy that wants to develop and prosper. This concern stems from the important role of banks in financial intermediation and their ability to deal with transaction and information costs thereby achieving financial and economic stability and leading to economic growth. Since banks are so vital to the economy, they are usually not allowed to operate freely. It is necessary to have them abide by regulations, which is a wide range of policies and rules that govern the behavior of banks, to ensure that they are not taking on excessive risks and that they are able to maintain depositors' confidence in the banking system thus avoiding bank runs and bank failures. When talking about banking regulation, it is indispensable to refer to banking supervision which is the enforcement procedures that take place to ensure that banks are complying with the regulations.[1]

Since banks account for a major part of the financial sector, banks' performance is a main driving force for the development of the financial sector and the economic performance as a whole. Banks' role in the intermediation and efficient allocation of funds is based on the depositors' confidence in the banking system's ability to pay their funds back. If people lose that confidence, bank failures may occur and financial and economic crises may result.[2] This is why banks, unlike business firms, are subject to a number of legal and regulatory restrictions. "These constraints are imposed because banks are considered too vital to the welfare of the economy to be permitted to operate freely under the law of supply and demand". The failure of a firm or a bank will harm the owners, employees, creditors and customers. But banks not only have a much greater number of creditors / customers but they also do not really consider themselves creditors but view the bank as the riskless safe keeper of their wealth. Only the large depositors examine and evaluate the financial statements of their banks. This means that bank failure is far more harmful to the citizens and the economy than the failure of any other type of business and this is a main reason why banks need to be under regulation and supervision.[3]

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1 Barth (2006, p.4)

2 Neyapti (2005, p. 80 f)

3 Kaufman (1977, p. 102 f)

The world's current financial crisis, which is the most severe since the great depression of 1929 is a proof of the importance of having a sound banking system on the performance of the world economy. The crisis is a natural consequence of the leniency in enforcing the necessary bank regulations. This paper does not directly address the current financial crisis where the world's largest financial markets are experiencing unprecedented volatility and the world's strongest economies are heading for severe recessions.[4] However, amid this crisis, bank regulation and supervision are becoming red hot topics of high interest because it is necessary to look back to the rules and regulations to analyze them and find out what went wrong. This is vital to prevent the re-occurrence of such crisis.

This paper starts with highlighting the importance of banks; explaining their three important tasks and showing how well they deal with information and transaction costs. The core of this paper then, introduces a simple regulation index that can be used to quantify and measure the quality of banking regulations. It measures the intensity of regulations in a given country in a given period of time and the corresponding effectiveness and performance of the banking system following the regulations. This index is developed with reference to the study of Neyapti, Dincer (2005). However, a gap existed in applying such an index to Egypt and therefore, this paper is enriched by its last section which includes an application of the regulation index to the Egyptian banking sector comparing its performance before and after the banking reform of year 2003.

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[4] The Economist (2008, Developed Economies Over the Edge)

2. The Importance and Roles of Commercial Banks

"Commercial banks are the largest, most important, and most diversified of all financial intermediaries."[5] They collect savings from surplus spending units (SSUs) and direct the funds to deficit spending units (DSUs). Commercial banks raise funds mainly by accepting savings and time deposits. These are the bank's liabilities as the bank has to pay these funds back to the SSUs with interest. Commercial banks use the funds to give different types of loans which are considered the banks' assets. A commercial bank is a profit making firm that earns profit by charging an interest on loans that is higher than the interest it pays on the deposits.[6]

Financial intermediaries and commercial banks in specific have become so vital in the financial sector because they engage in three very important tasks:[7]

1) **Denomination / Volume Intermediation:**

The need for volume intermediation exists because DSUs are likely to demand higher volumes of funding than the volumes SSUs are willing to give.

2) **Maturity Intermediation:** [8]

The need for maturity intermediation exists because DSUs usually need loans with longer maturities (later payback) than the period SSUs are willing to leave their funds for. This maturity problem can exist even when the volume compatibility problem is solved.

3) **Risk Intermediation:**

Since a typical lender is risk averse, risk intermediation can be regarded as one of the most important tasks banks engage in and could be even considered a reason for bank existence. Due to their large size, banks are able to diversify and lend loans to different

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5 For simplicity, I will use commercial banks or financial intermediaries interchangeably

6 Ritter (1993, p. 39 f)

7 Kaufman (1977, p.59)

8 Bebczuk (2003, p.77 f)

firms in different sectors. This is beneficial because failures in some sectors can be compensated by the gains of other sectors. The ability to diversify is an advantage that requires professional experience and large scale that are not usually available to individual lenders. [9] Banks are also more experienced in analyzing the credit risk of their borrowers and can accordingly adjust the interest rate it charges them. This makes banks better risk bearers and makes SSUs prefer using banks as financial intermediaries rather than investing directly.

The importance of financial intermediaries also stems from their ability to deal better with transaction and information costs than individuals can on their own.

Transaction costs are "the time and money spent in carrying out financial transactions." Commercial banks can significantly reduce transaction costs because they bundle the funds of many investors together and so, their large size allows them to take advantage of economies of scale (the reduction in transaction costs per transaction as the number of transactions increases). Economies of scale in financial markets exist because the total cost of carrying out a transaction increases by less than the size of the transaction growth. [10] Therefore, it could be unprofitable for an individual to carry out small transactions on his own since the return might not cover or only slightly cover the transaction costs involved.

Information is expensive to gather and use. "Information costs include the assessment of the project and the entrepreneur, and monitoring during the time span of the contract". Information costs exist due to the presence of asymmetric information. Asymmetric information has two main forms: Adverse Selection and Moral Hazard.

Adverse selection is a form of asymmetric information that, as the name suggests, occurs in the selection process of a contract before the transaction takes place, i.e. money is still with the lender. It exists because the borrower holds private information before the relationship is begun and will only reveal it to the lender if it is in his/her interest. This

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9 Bebczuk (2003, p.77 f)

10 Mishkin (2006, p.29ff & 173)

leaves the lender at an information disadvantage having the risk that the funds given to the borrower might not be paid back. [11] This increases the probability of selecting a bad credit leading to insecurity in the financial market because the risk of default becomes higher. Consequently, adverse selection makes lenders reluctant to give out loans at all even though there are some good credits in the market and by time, those good credits will also disappear. [12] However, banks have become experts in *screening* potential borrowers and in the production of information about their credit worthiness. This enables them to distinguish good credits from bad ones. Banks often use credit ratings[13] to evaluate the credit risk of a potential borrower and decide on the interest rate to charge accordingly. This screening process makes lenders feel safe and guarantees that their money will be paid back making them more open to lending.

Moral hazard is another form of asymmetric information which occurs after the transaction takes place, i.e. money already with the borrower. This means that both parties have the same level of information at the beginning of the relationship but once the contract has been signed, the lender is not able to fully observe the borrower and consequently becomes at an information disadvantage. [14] In the financial context, this means that the borrower invests in a different project than the one agreed upon with the lender. Since borrowers are using someone else's money, they are tempted to engage in immoral / riskier projects, i.e. projects that will yield higher return if they succeed but have a higher probability of failure / default. However, banks have restrictive provisions in their loan contracts to limit borrowers from engaging in risky activities. This is a good means of control over the behavior of borrowers as banks can monitor their activities to ensure their compliance with the provisions and enforce them if violated. This can guarantee the good behavior of borrowers, consequently showing that financial intermediation is a better means of channeling funds from SSUs to DSUs than direct financing.

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11 Stadler (2001, p.11)

12 Mishkin (2006, p.32)

13 Details on the calculation and analysis of the ratings are beyond the scope of this paper.

14 Stadler (2001, p.9)

3. Regulation Index to Measure the Quality of Bank Regulations [15]

The regulation index is composed of an input based regulation index and an output based regulation index to help quantify the quality of banking regulations and supervision. The input based index consists of criteria that reflect the efforts implemented by governments / bank supervisors to achieve an efficient banking system. The output based index on the other hand evaluates the outcomes / performance of these efforts. The concept of this regulation index is similar to the concept of the cost-benefit analysis applied in public finance. The input index resembles the cost signifying the efforts made by the governments and supervisors to setting rules and supervising over them. The output index resembles the benefit which is basically the performance / outcome of the regulations and supervision. Table 1 summarizes the input and output components of the index chosen to analyze the quality of bank regulations. These criteria are not exclusive. There could be other relevant criteria in this aspect that are not covered in this paper.

In practice, the criteria of each index will all be assigned equal weights; 20% each for the input side and 25% each on the output side. In other situations or further applications, the criteria can be assigned different weights but I do not have a strong argument to assigning differentiated weights.

Table 1: Criteria of input and output based indices

Input-based criteria	Output-based criteria
1) Regulations to enforce the transparency of banks' operations 2) Regulations to cut off risky behaviour by banks 3) Deposit insurance existence and implementation 4) Criteria for qualifications of bank managers 5) Criteria for licensing of banks	1) Amount / Value of deposits 2) Risk based capital ratio and other banking ratios 3) Insolvency of banks / bankruptcy 4) Performance of the banks' managers in terms of profitability and amount of risk taking

[15] This index is developed with reference to the study of Neyapti, Dincer (2005)

4.1 Input Based Index

A brief description of each criterion chosen and its significance in evaluating the quality of bank regulations will be explained. Each criterion is further sub-divided to several questions that can be answered on a 0/1 scale where 1 indicates the highest intensity of regulations and 0 indicates the lowest intensity of regulations. After each input based criterion has been broken down into measurable standards, we take an unweighted average of the responses of the questions under each criterion leading to 5 indices, one for each of the main criteria. We then get a weighted average of these indices based on the 20% weight for each criterion and finally calculate an aggregate value for the input based index.

1) Regulations to enforce the transparency of banks' operations

The first criterion relates to the third pillar of the New Basel Accord[16]; Enhanced Disclosures. It should be required by all supervisors that commercial banks disclose their financial statements. Basically, the balance sheet of a bank is the most important financial statement because it reflects the bank's financial position as it gives information about the amount of capital the bank holds as well as its liabilities as opposed to its assets. To enhance the accuracy of information, it should be required that the balance sheet is revised by an external auditor in accordance with international auditing standards to make sure it complies with the international accounting standards and finally, it should be published in a national newspaper on an annual basis.

a) Are banks required to disclose their balance sheet in a national newspaper on annual basis or more frequently?

1 – Yes

0 – No

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[16] The New Basel Accord was released by the Basel Committee in June 2004 to apply common regulatory standards to the banking industries of member countries.

b) Is it a requirement that external auditors revise the balance sheet?

1 – Yes

0 – No

c) Is the balance sheet checked for compliance with international accounting standards?

1 – Yes

0 – No

d) Is the balance sheet revised in accordance with international auditing standards?

1 – Yes

0 – No

2) Regulations to cut off risky behaviour by banks

The amount of risks banks take is a critical issue for the stability of the banking sector. It is therefore an issue of concern to the depositors, the regulators and the government. It is not enough to have regulations and criteria but it is necessary that supervisors check that they are complied with and that banks really do implement them. This relates to the first and second pillars of Basel II, minimum capital requirements (measured by the risk based capital ratio) and supervisory review respectively.

a) Are there regulations decided by the government / the bank supervisors of a country to address the amount of risk banks are allowed to take?

1 – Yes

0 – No

b) If regulations exist, is there supervision that they are being implemented?

1 – Yes

0 – No

c) Is the minimum reserve requirement[17] stated in the law?

1 – Yes

0 – No

d) Is the liquidity ratio ($\frac{CashHeldAtBank}{TotalDeposits}$) stated in the law?

1 – Yes

0 – No

3) Deposit insurance existence and implementation

The existence of deposit insurance is a very important aspect of a banking system. It is considered a safety net that helps maintain the people's confidence in the banks. Explicit deposit insurance is a formal commitment by the deposit insurance institutions that allows citizens to know facts about the deposit insurance system in their country in terms of who implements it and the extent of coverage they get, i.e. whether they are guaranteed 100% of their deposits back or only a portion. With implicit deposit insurance, there are no clear cuts. All information depositors have is from observing how failed banks were handled / bailed out previously and expecting they will be handled in the same manner. Citizens believe that deposit insurance provided by the government is safer than that provided by a private institution.

a) Is there a deposit insurance system in the country?

1 – Yes

0 – No

b) If yes to (a), is it mandatory for all banks to join? I.e. is it a must that banks join the deposit insurance system to get a bank license?

1 – Yes

0 – No

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[17] Percentage of bank deposits held at the CB

c) If yes to (a), is it an explicit or implicit scheme?

1 – Explicit

0 – Implicit

d) If yes to (a), who finances the deposit insurance?

1 – The government

0 – Private institutions

e) If yes to (a), what is the extent of coverage of the deposit insurance?

1 – Full coverage

0 – Partial Coverage

4) Criteria for qualifications of bank managers

A main determinant of the performance and the success of a bank is the quality of its management. Quality of management is a function of the managers' professional qualifications and ethical standards. The professional dimension can, in the most basic sense, be measured in the number of years of experience and the educational background. It is also useful to take into consideration some other relevant courses the candidate has attended and his/her performance in these courses. [18]

Unfortunately, ethical standards are difficult to quantify and measure however, a candidate can be asked how he or she would react in certain ethical situations and conclusions can be drawn from their responses. A person's history and previous work relationships can be scanned to get an idea of his ethical standards as well.

a) Is the number of years of experience of managers set in the law?

1 – Yes

0 – No

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[18] This point aims to infer the candidate's knowledge about and motivation for his field.

b) Are relevant courses attended by candidates and a high performance in these courses taken into consideration?

1 – Yes

0 – No

c) Are ethical standards considered when appointing the bank's management?

1 – Yes

0 – No

5) Criteria for licensing of banks

Granting a bank a licence is a critical decision that should be taken seriously. There should be a single authority responsible for granting the license to minimize political interference. This authority should have the power to turn down applications that do not meet the requirements. It should be able to screen the owners' and manager's qualifications and ethical standards. The stipulations set should give an indication that the licensed bank is in fact up to the standard and will be able to perform well. These conditions should address the minimum capital requirements and should forbid industrial conglomerates from establishing their own banks to facilitate their access to credit.

a) Are there specific regulations and criteria for the establishment of a new bank and for the merger of banks?

1 – Yes

0 – No

b) Who has the authority of licensing a new bank?

1 – A single authority

0 – Not clearly defined, there is room for political interference

c) Are the bank's owners and managers screened before the license is granted?

1 – Yes

0 – No

d) Are there specifications for the minimum capital requirements?

1 – Yes

0 – No

e) Are banks checked for having a reasonable business plan and financial projections?

1 – Yes

0 – No

f) Are large industrial conglomerates allowed to establish a bank?

1 – No

0 – Yes or not mentioned in the law

4.2 Output Based Index

The output based index includes criteria that help evaluate the effectiveness of the input based index showing the performance of the regulations and indicating the performance of the banking industry. A brief description of the four criteria chosen and the significance of each in evaluating the quality of bank regulations will be explained. As with the input based index, each criterion is sub-divided to several questions. The difference here which makes the output index more complicated is that many of the questions are arbitrary meaning that there is a continuous set of answers and are therefore not measurable on a 0/1 scale. To deal with this problem, a duration for the application of this model has to be specified where the highest/lowest (depending on the criterion) observed figure within this duration would be given a value of 1 indicating the best performance and the lowest/highest observed figure would be given a value of 0 indicating the worst performance. Finally, the year under study can be evaluated based on these limits on a 0/1 scale. [19] After each output based criterion has been broken down into

[19] Although this normalization method is informative, its main weakness is that as more years are added to the observed duration, the upper and lower limits may change and consequently the scale given to the selected year under study will also change.

measurable standards, an unweighted average of the responses of the questions under each criterion is calculated leading to 4 indices, one for each of the main criteria. We then get a weighted average of these indices based on the 25% weight for each criterion and finally calculate an aggregate value for the output based index.

1) Amount / Value of deposits

If banks are really abiding by the regulations and operating with transparency, citizens would have an increased confidence in the banking system. This can be measured by the amount of deposits that people leave in the banks relative to GDP. The higher this value, the better as a higher amount of deposits signals people's confidence in the banking system. Another useful measure would be the percentage of the population with a bank account. However, unfortunately, the information is not available in all countries (it is not available in Egypt where the index is applied in the next chapter) and therefore this measure will be dropped from this index but I believe, when available, it would be a very informative indictor. It would be calculated as $\frac{PopulationWithABankAccount}{TotalPopulation}$. Though less informative, this measure can be replaced by dividing the total population over the total number of commercial bank branches to indicate the number of citizens each branch serves. The lower this figure, the better as it shows the widespread of banks indicating that the banking industry is growing.

a) Deposits as a percentage of GDP:

$$\frac{DepositsInLocalCurrency}{GDP} \tag{1}$$

b) Number of citizens served by each commercial bank branch:

$$\frac{TotalPopulation}{NumberOfCommercialBankBranches} \tag{2}$$

2) Risk based capital ratio and other banking ratios

Since risk is the main issue of concern to the financial sector and the banking system, specific risk measures must exist and must be enforced to guarantee that banks are

not taking on excessive risks. The existence and enforcement of these measures were analyzed in the input index and their effectiveness is to be measured under this section. This issue of risk management has been broadly discussed in The Basel Accords which identified a risk based capital ratio that sets the ratio of regulatory capital to risk weighted assets. It is necessary to measure whether banks are abiding by such ratios or not. According to Basel, the calculation of the risk based capital ratio should be at a minimum of 8%. The equity ratio is another informative ratio which shows the ratio of total equity (or total capital) to the total assets banks are holding. A more relevant risk measure for the banking industry would use total loans and not total assets showing the proportion of loans covered by the bank's own capital. From a risk point of view, the higher the ratio, the better because this means that the banks' loans are backed up with a high level of capital. Another measure worth calculating is the provisions for loan losses which is calculated by dividing the provisions of banks by the total loans. This ratio gives an indication of the amount of risk expected to exist in the current loan portfolio of banks. This means that the lower the value of this ratio, the better because lower values indicate lower expectations of loan loss i.e. lower risk. The total loans in these two ratios include the loans granted to the public and to other banks. Loans to the government are not added since they are considered risk free and therefore do not have to be backed up by capital and are not in need for provisions in the first place.

a) Is the risk based capital ratio relative to Basel achieved, i.e. 8%?

1 – Yes

0 – No

$$RiskBasedCapitalRatio = \frac{\mathrm{Re}\,gulatoryCapital}{RiskWeightedAssets} \tag{3}$$

b) Equity Ratio

$$\frac{TotalEquit\,y}{TotalLoans} \tag{4}$$

c) Provisions for loan losses

$$\frac{\mathrm{Pr}\,ovisions}{TotalLoans} \tag{5}$$

3) Insolvency of banks / bankruptcy

Bank runs and bankruptcies are the biggest threats to banks and therefore, preventing bank runs and bankruptcies are top priorities for the regulatory and supervisory authorities of banks. The occurrence of bankruptcies can signal a deficiency in the quality of regulation and should therefore be considered in this output index. If bankruptcies existed, it is most likely to evaluate the deposit insurance system in an economy at the time of the bankruptcy and check whether depositors received their insured deposits or not.

a) Were there bankruptcies over the past five years[20]?

1 – No

0 – Yes

b) If yes, did the deposit insurance system pay?

1 – Yes

0 – No

4) Performance of the banks' managers and amount of risk taking

A good way to measure if the regulations on the choice of bank managers are of high quality is to measure the performance of these managers in several aspects; profitability, risk and maturity mismatch. A reasonable measure of profitability is the ROE. For the purpose of this study, limiting profits to operating profits instead of total profits is a better indication of the manager's performance.[21] Obviously, the higher the ROE, the better because it shows that the bank is able to generate more profits from its capital. Measuring the amount of risk incurred can be achieved by calculating the variance / standard deviation of the profits which measure the dispersion / fluctuation of the profits.

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[20] Five years back from the year under study. This period could be longer but 5 years was the most suitable for the purpose of applying to Egypt.

[21] If operating profits are not available, total profits can be used instead.

A larger variance / standard deviation signals higher risk because it means that the profits are not stable. Another way to evaluate the managers' performance is to measure how well they can handle the maturity mismatch between their assets (loans) and their liabilities (deposits) so that they do not fall short on liquidity or become unable to pay back the deposits at any given time.

a) Profitability / ROE

$$\frac{Operating\ \Pr ofits}{TotalEquity} \tag{6}$$

b) Variance of Profitability[22]

$$Var = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2 \tag{7}$$

c) Long term assets (loans) to long term liabilities (deposits) + equity

$$\frac{LongTermAssets}{LongTermLiabilities + Equity} \tag{8}$$

The value of this model will become apparent when applied on a cross country or a time series study where the input and output indices will be calculated for different countries or different years and changes in the figures can be compared. An increase in the input based index means that the government / supervisors are dedicating more efforts to setting banking regulations and to enforcing them and vice versa. An increase in the output based index means that the performance of the banking system is improving and vice versa. Expectations are that an increase in the input index is at least matched by an increase in the output index. If the input based index is increasing more than the output index value, this signals that the costs of regulations are exceeding the benefits gained. If the output based index is increasing without having increased the input index (is constant or decreasing), this can mean that the efficiency of regulations is increasing (less input

[22] Where n is the number of years and $\bar{x}$ is the average of observed profits.

yields higher output) but this questions the reasons and importance of having bank regulations at all.

4. Application of the Quality Index to Egypt

The last chapter of this paper applies the regulation index described in chapter 4 on Egypt in a time series study. Egypt's banking sector reform in year 2003 adds value to this application where year 2002 will be analyzed to resemble before reform and the results will be compared to those of year 2007 to resemble after reform. This comparison will help identify the change in the intensity of regulation and the performance of the banking sector as a result of the reform. The following tables two (input index) and three (output index) summarize the results of the calculations[23].

[23] Dashes (-) will be used when the question is irrelevant or not applicable

Table 2: Regulatory Input Index for Egypt (2002 versus 2007)

	2002	2007
1) Regulations to enforce transparency		
a) Are banks required to disclose their balance sheet in a national newspaper on annual basis or more frequently?	0	1
b) Is it a requirement that external auditors revise the balance sheet?	1	1
c) Is the balance sheet checked for compliance with international accounting standards?	0	1
d) Is the balance sheet revised in accordance to international auditing standards?	1	1
Total value of index component	*0.5*	*1*
2) Regulations to cut off risky behaviour by banks		
a) Are there regulations decided by the government / the bank supervisors of a country to address the amount of risk banks are allowed to take?	1	1
b) If regulations exist, is there supervision that they are being implemented?	1	1
c) Is the minimum reserve ratio stated in the law?	1	1
d) Is the liquidity ratio stated in the law?	1	1
Total value of index component	*1*	*1*
3) Deposit insurance existence and implementation		
a) Is there a deposit insurance system in the country?	0	0
b) If yes to (a), is it mandatory for all banks to join? I.e. is it a must that banks join the deposit insurance system to get a bank license?	-	-
c) If yes to (a), is it an explicit or implicit scheme?	-	-
d) If yes to (a), who is the provider of deposit insurance?	-	-
e) If yes to (a), what is the extent of coverage of the deposit insurance?	-	-
Total value of index component	*0*	*0*
4) Criteria for qualifications of bank managers		
a) Is the number of years of experience of managers set in the law?	1	0
b) Are relevant courses attended by candidates and a high performance in these courses taken into consideration?	0	0
c) Are ethical standards considered when appointing the bank's management?	1	1
Total value of index component	*0.67*	*0.33*
5) Criteria for licensing of banks		
a) Are there specific regulations and criteria for the establishment of a new bank or for the merger of banks?	1	1
b) Who has the authority of licensing a new bank?	1	1
c) Are the bank's owners and managers screened before the license is granted?	1	1
d) Are there specifications for the minimum capital requirements?	1	1
e) Are banks checked for having a reasonable business plan and financial projections?	1	1
f) Are large industrial conglomerates allowed to establish a bank?	0	0
Total value of index component	*0.83*	*0.83*
Total value of input index (weighted average of index components)	**0.6**	**0.632**

Table 3: Regulatory Output Index for Egypt (2002 versus 2007)

	2002	2007
1) Amount / Value of deposits		
a) Deposits as a percentage of GDP	0.71	1
b) Number of citizens served by each commercial bank branch	0.028	1
Total value of index component	*0.37*	*1*
2) Risk based capital ratio and other banking ratios		
a) Is the risk based output relative to Basel achieved, i.e. 8%?	1	1
b) Equity Ratio	0	0.74
c) Provisions for loan losses	0.31	1
Total value of index component	*0.437*	*0.913*
3) Insolvency of banks / bankruptcy		
a) Were there bankruptcies in Egypt over the past five years? 1 – No 0 – Yes	0	1
b) If yes, did the deposit insurance system pay?	-	-
Total value of index component	*0*	*1*
4) Performance of the banks' managers and amount of risk taking		
a) ROE (Profitability)[24]	0	1
b) Variance / standard deviation of profits[25]	0	1
Total value of index component	*0*	*1*
Total value of output index (weighted average of index components)	0.2	0.98

By observing the results obtained from applying the index on Egypt, it is clear that the input index increased only slightly from 0.6 in 2002 to 0.632 in 2007. This means that there is actually a minor increase in the intensity of regulations. This result is to some degree unexpected as it was believed that the intensity of regulations became much higher with the banking reform in 2003. However, the output index has impressively leaped from 0.2 in 2002 to 0.98 in 2007. This is a clear sign of the improvement of the performance of the banking sector after the reform.

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[24] With reference to Table 8 and Table 9 in the Appendix concerning the calculation of the ROE, the period with the lower average ROE (1998 to 2002) gets a Zero and the period with the higher average ROE (2003 to 2007) gets a value of 1.

[25] With reference to Table 10 and Table 11 in the Appendix concerning the calculation of the variance and standard deviation, the period with the higher Variance and standard deviation (1998 to 2002) gets a Zero and the period with the lower variance and standard deviation (2003 to 2007) gets a value of 1.

Looking at the results from another perspective, it becomes obvious that the efficiency of regulations has become so much higher. In 2002, the input index was 0.6 with a corresponding output of 0.2. On the other hand, in 2007, the input index was 0.632 and it yielded an output index of 0.98. This shows that with almost the same intensity of regulations, a much higher performance can be achieved and this only means that the input regulations have become more efficient. This can possibly be attributed to the fact that the banking reform was part of the more general successful economic reform. Other programs of this economic reform that have actually been implemented were the tax system reform, increased privatization and the settlement of the QIZ agreement. These programs raised the government's credibility and proved to the whole world, and most importantly to the citizens, that the government was serious and committed to its reform. The citizens consequently expected similar improvements in the banking industry and so, the investment climate in Egypt became more attractive and banking sector improved significantly.

These interesting results are also alarming! The CBE should take into consideration that the higher efficiency of the input index may not be sustainable in the medium or in the long run. It has to consider working on the inputs more. The deposit insurance is a clear weakness point. Establishing the "Deposit Insurance Fund at Banks" should be a priority now. Strengthening the input index will be the key to sustaining a high performance in the future.

5. Conclusion

This paper has studied commercial banks; their roles and their importance to having a healthy financial system that can consequently lead to economic growth. It has focused on the regulation and supervision of commercial banks because they are the largest, most important and most diversified of all financial intermediaries. And especially with the current financial crisis, regulation is becoming an increasingly important issue. More research should be dedicated to regulation and supervision to prevent such turmoil from reoccurrence.

Measuring the quality of banking regulation is generally difficult because it is a qualitative analysis and is arbitrary. In an attempt to measure the quality of bank regulations, a regulation index has been modelled comprising an input regulation index that measures the intensity of the regulations set by the government / supervisors and compares it to an output regulation index that measures the performance of the banking system. It is important to note that this index makes more sense when implemented on a time series analysis comparing the intensity of regulations with bank performance over the years as the application to Egypt showed. It can also be very valuable in comparing between the banking systems of several countries.

Finally, an application to Egypt resembling a developing country was performed. Egypt's case is especially interesting as it has undergone a serious economic and banking reform in 2003; therefore, the regulation index has been applied to Egypt to compare a year before the reform (2002) to a year after the reform (2007).

This paper concludes that regulation is an indispensable aspect of having a healthy banking system, financial sector and a growing economy. Egypt's results show that it is doing well but more focus is needed in the input area to make regulations more intense so it can guarantee the sustainability of its improving performance.

References

Barth J., et.al (2006), *Rethinking Bank Regulation: Till Angels Govern*, Cambridge University Press

Bebczuk R. (2003), *Asymmetric Information in Financial Markets, Introduction and Applications*, Cambridge University Press

Economist (2008), *Over the Edge*, http://www.economist.com/finance/displaystory.cfm?story_id=12523906 (Retrieved on 1 December 2008)

Kaufman G. (1977), *Money, The Financial System and the Economy*, 2nd Edition, Rand Mc.Nally College Publishing Company

Mishkin F. (2006), *The Economics of Money, Banking and Financial Markets*, 7th Edition, Addison Wesley

Neyapti B., Dincer N. (2005), *Measuring The Quality Of Bank Regulation And Supervision and Its Macroeconomic Effects - An Application to Transition Economies*, Journal of Economic Inquiry, Vol. 43, p. 79-99

Ritter L., Silber W. (1993), *Principles of Money, Banking, and Financial Markets*, 8th Edition, HarperCollins Publishers

Stadler I., Castrillo J. (2001), *An Introduction to the Economics of Information: Incentives and Contracts,* 2nd Edition, Oxford University Press

Appendix

Table 4: Deposits and GDP between 1998 and 2007

Year	Deposits in Millions	GDP in Millions	Percentage of Deposits to GDP
1998	142738	266757.7	53.51%
1999	161162	282578.0	57.00%
2000	172298	315667.0	54.58%
2001	185968	332543.8	55.92%
2002	210224	354563.8	59.29%
2003	230964	390619.4	59.13%
2004	255283	456322.4	55.94%
2005	309676	506511	61.14%
2006	349223	581144.1	60.09%
2007	421854	684429.8	61.64%

Source for deposits:
http://www.cbe.org.eg/TimeSeries/Banking%20Survey/2-Deposits%20in%20Local%20Currency.xls
Source for GDP:
Ministry of Planning, http://www.mop.gov.eg/English/GDP.htm

Table 5: Population & number of commercial bank branches between 2002 & 2007

Year	Population in millions	Number of commercial bank branches (excluding off shore banks)	Number of citizens per commercial bank branch
1998	60.7	1220	49754
1999	62.0	1241	49960
2000	63.3	1253	50519
2001	64.7	1288	50233
2002	66.0	1294	51005
2003	67.3	1300	51769
2004	68.6	2724	25184
2005	70.0	2792	25072
2006	71.3	2896	24620
2007	72.7	3004	24201

Note: Population of 2007 calculated based on 0.02% growth rate.
Source for population:
http://www.cbe.org.eg/TimeSeries/Population,Labour%20force&%20Unemployment%20Rate.xls
Source for number of branches:
http://www.cbe.org.eg/TimeSeries/structure%20of%20the%20Egyptian%20%20Banking%20System.xls

Table 6: Equity Ratio

Year	Total Equity / Total Capital	Total Loans[26]	Equity Ratio
1998	10566	240107	4.4%
1999	11373	265336	4.29%
2000	11764	293952	4.0%
2001	12038	324769	3.71%
2002	12531	369346	3.39%
2003	18155	425394	4.27%
2004	20346	455779	4.46%
2005	22949	484385	4.74%
2006	27112	518290	5.23%
2007	33037	695475	4.75%

Source for total capital and total loans:
http://www.cbe.org.eg/TimeSeries/Banks/1-Aggregate%20Balance%20Sheet.xls

Table 7: Provisions for loan losses

Year	Provisions in millions	Total loans in millions	Percentage of provisions to loans
1998	23392	240107	9.74%
1999	25984	265336	9.79%
2000	27554	293952	9.37%
2001	31200	324769	9.61%
2002	35869	369346	9.71%
2003	40099	425394	9.43%
2004	44584	455779	9.78%
2005	49541	484385	10.23%
2006	54950	518290	10.6%
2007	53469	695475	7.69%

Source for provisions and total loans[27]:
http://www.cbe.org.eg/TimeSeries/Banks/1-Aggregate%20Balance%20Sheet.xls

[26] Calculations of total loans= balances with banks in Egypt + balances with banks abroad + loans and discounts. The securities and investments have not been included since they are considered risk free loans to the government and do not need to be backed by the bank's capital.

[27] Calculations of total loans= balances with banks in Egypt + balances with banks abroad + loans and discounts. The securities and investments have not been included since they are considered risk free loans to the government.

Table 8: ROE in the first period (1998 to 2002)

Year [28]	ROE
2001	12.35%
2002	8.90%
Average	10.63%

Sources for ROE available in the annual reports published by the CBE dated 02/03, 03/04, 04/05, 05/06 and 06/07. http://www.cbe.org.eg/publications.htm

Table 9: ROE in the second period (2003 to 2007)

Year [29]	ROE
2003	10.2%
2004	11.0%
2005	13.0%
2006	14.1%
Average	12.1%

Table 10: Variance/ Standard Deviation of Profits in the first period (1998 to 2002)

Year	ROE (x_i)	Average ROE ($\bar{x}$)	($x_i - \bar{x}$)	($x_i - \bar{x}$)^2
2001	12.35%	10.625%	1.725%	0.000297563
2002	8.90%	10.625%	-1.725%	0.000297563
				Σ= 0.000595125

Standard Deviation = 0.0243

Table 11: Variance of Profitability in the second period (2003 to 2007)

Year	ROE (x_i)	Average ROE ($\bar{x}$)	($x_i - \bar{x}$)	($x_i - \bar{x}$)^2
2003	10.2%	12.0625%	-1.8625%	0.0003469
2004	11%	12.0625%	-1.0625%	0.0001129
2005	13%	12.0625%	0.9375%	0.0000879
2006	14.05%	12.0625%	1.9875%	0.0003950
				Σ = 0.0009427

Standard Deviation = 0.018

[28] Information on ROE was not available for years 1998, 1999 and 2000 so the calculation of the first period is limited to 2001 and 2002.

[29] Information on ROE was not available for the year 2007 so the calculation of the second period is limited to 2003, 2004, 2005 and 2006.